



U.S. Department of Energy
Energy Efficiency and Renewable Energy

Overview of Greywater Systems And Composting Toilets



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Topics Covered

- Rationale for Greywater and Composting
- Types of Greywater Systems
- Composting Toilet Process
- Examples
- Permitting
- LEED



Why Greywater Recycling and Composting Toilets?

- Water Conservation
- Soil Protection and Enhancement
- No Pollution
- Minimal Site Disturbance
- Complete On-Site Treatment
- Recycling of Nutrients



What's In Greywater?

- 1/10th the nitrogen in total wastewater
- low bacterial content
- plant nutrients (potassium-based soap)



What's Greywater Good For?

- Turn it back to drinking water?
Too difficult, too expensive. Not sensible.
- Flushing toilets?
Are you kidding? No way!
- Irrigate plants?
Now you're talking!



Examples of Greywater Systems

- Living Machine[®]





Living Machines Pros 'n Cons

Pros

- High level of 'treatment'
- Very sexy, high tech

Cons

- Needs own structure
- Complex system
- High maintenance
- High cost



Examples of Greywater Systems

- Constructed Wetland





Constructed Wetland Pros 'n Cons

Pros

- High level of 'treatment'
- Low maintenance

Cons

- Requires plenty of real estate



Examples of Greywater Systems

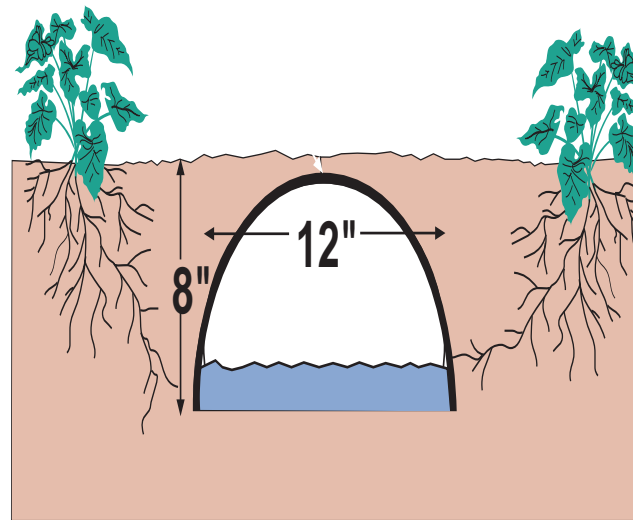
- Irrigation Chamber System





Examples of Greywater Systems

- Irrigation Chamber System





Examples of Greywater Systems

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Examples of Greywater Systems

- Irrigation Chamber System





Examples of Greywater Systems

- Irrigation Chamber System





Examples of Greywater Systems

- Irrigation Chamber System





Irrigation Chamber Pros 'n Cons

Pros

- High level of 'treatment'
- Low maintenance
- Low cost

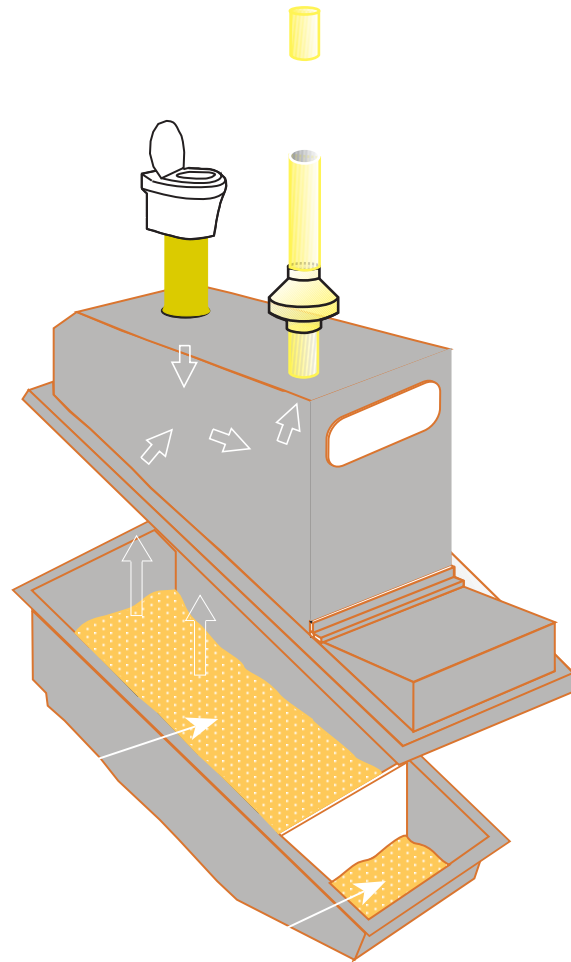
Cons

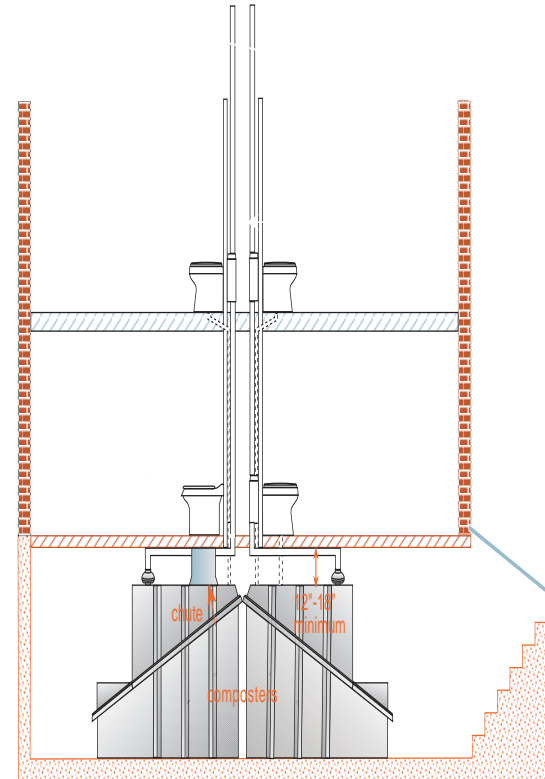
- Un-sexy, practically invisible.



Compost Toilet

- Zero pollution discharge
- Captures nutrients for re-use as fertilizer
- Conserves water









McDonalds/Mobil Convenience Stop
Exit 3, I-93, Windham, NH



McDonalds/Mobil Convenience Stop
Exit 3, I-93, Windham, NH



McDonalds/Mobil Convenience Stop
Exit 3, I-93, Windham, NH



Bunker Interpretive Center, Calvin College
Grand Rapids, MI



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Grand Rapids, MI



Bunker Interpretive Center, Calvin College
Grand Rapids, MI



Chesapeake Bay Foundation, Annapolis, MD



Chesapeake Bay Foundation, Annapolis, MD



Chesapeake Bay Foundation, Annapolis, MD



C.K. Choi Center for East Asian Studies
University of British Columbia, Vancouver



C.K. Choi Center for East Asian Studies
University of British Columbia, Vancouver



Battery Park Ballfield, Manhattan



Maintenance Options

- By manufacturer
- By owner
- Combination manufacturer/owner



Permitting

- AZ DEQ Title 18
 - Composting Toilets: OK
 - Greywater Systems: Performance-based



LEED

- Water Efficiency Points
 - Water Efficient Landscaping (50% reduction)
 - Water Efficient Landscaping (0% potable H₂O)
 - Innovative Wastewater Technology
 - Water Use Reduction (20% reduction)
 - Water Use Reduction (30% reduction)